

BUILDING SIDING

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

[1000] This invention is directed toward an insulated building siding component, insulated building siding, and insulated siding accessories.

2. DESCRIPTION OF THE RELATED ART INCLUDING INFORMATION DISCLOSED UNDER CFR §§ 1.97-1.99

[1001] It is presently known to construct buildings, particularly homes, by first building the house frame, optionally covering the frame with sheeting material, covering the outside of the frame, or the sheeting material, with sheets of rigid insulation, and then applying a finish layer over the insulation sheets. The finish layer can be bricks, stone or stucco-type material. The finish layer is usually applied at the site. The application of the finish layer, on-site, is however time consuming and dependent on the weather.

[1002] To construct the buildings in the above manner more quickly, it is known to provide large, prefabricated, building panels which are constructed off-site and shipped to the construction site for installation. These building panels usually comprise a base of rigid, or self supporting, insulation material and an outer finish layer on one side of the insulation base and integral therewith. The panels are applied directly to the frame of the house with the insulation adjacent the frame and the finish layer facing outside. The known large panels can take many forms. Many have support framing incorporated directly into the panels. Examples of the large panels are shown in US patents 4,774,794; 5,540,020 and 5,555,698 by way of example. Most of these large building panels have a stucco or stucco-like finish layer. Once the panels are installed on the house frame, a final finish coating must usually be applied to the outside of the panels. The final finish coating is applied to at least cover the joints between adjacent panels to make the structure jointless in appearance and to make it watertight. However, this still entails on-site masonry application. Also, these large buildings panels

cannot be easily handled by a single person, or even two people, and usually require heavy equipment for handling and installing them at the building site.

[1003] It is known to use smaller prefabricated building panels, in the form of siding panels, which have a rigid, or self-supporting, insulation base covered on at least one side by a finish layer. By siding panels it is meant building panels that are small enough to be easily handled by one worker. Examples are shown in U.S. Pats. 4,299,069 and 5,987,835. These building siding panels can be constructed off-site and then shipped to the construction site where they can easily be handled and applied by only one worker without the aid of machinery or moving equipment. Some of these known siding panels, such as shown in Pat. '835, still however require a finish coating application on-site to conceal the joints between the panels. Some of the known panels are designed to leave the joints exposed between the panels. This is particularly true where the panels comprise simulated brick. The joints are located between the courses of brick on the panel. However some of the panels, such as shown in Pat. '069, still require the on-site application of a finish coating in the joints to complete the installation making it waterproof.

SUMMARY OF THE INVENTION

[1004] It is the purpose of the present invention to provide an insulated, one-side finished, siding panel that is light enough that it can be easily applied to a small building by only one or two people without requiring the use of handling machinery or equipment. It is another purpose of the present invention to provide an insulated, one-side finished, siding panel that, when mounted on the building with other panels, presents a pleasing appearance with nothing further needed to complete the assembly. It is a further purpose of the present invention to provide an insulated, one-side finished, siding panel that lends itself to construction off-site and easy assembly on-site. It is a still another purpose of the present invention to have the joints between the panels designed to provide water proof horizontal

connections between the panels without requiring any further application of finishing material. It is a further purpose of the present invention to provide an insulated, one-side finished, siding panel that is coated with a finished stucco-like layer, that, when assembled with other similar panels, presents a finished, stucco-like surface on the building with definite joint grooves between the panels. It is another purpose of the present invention to provide an insulation base for a one-side finished, siding panel, the panel having the above attributes. It is a further purpose of the present invention to provide building accessories for use with the above siding panels facilitating easy installation of the panels.

[1005] The siding panel of the present invention comprises an inner base of suitable, rigid or self-supporting, insulation material and an outer finish layer of stucco-like material adhered on one surface of the base. The panel has outer and inner surfaces joined by top and bottom edges, with the outer surface of the panel formed by the outer surface of the finish layer. The top and bottom edges of the panel are parallel and angled downwardly and forwardly from the inner surface. The siding panel is provided with interlocking means, preferably in the form of tongue and groove connections on both edges, for securely interlocking the siding panels together. The front surface of the panel is scalloped at both the top and bottom sides adjacent the top and bottom edges so that the scalloped surfaces of adjacent interconnected panels form a concave groove at the front of the joint between the panels.

[1006] Each scalloped surface of the panel is preferably scalloped in a manner to form a semi-circular groove when the angled edges of adjacent panels abut. The angled edges serve to locate the mouth of the joint between adjacent panels in the groove above the horizontal center line of the groove to minimize the entry of water into the joint.

[1007] The siding panels can be easily fastened to a house frame by inserting fasteners through the top edge of the insulation base and can be easily cut to length as needed when

applying them around doors, windows or at building corners. The finish layer of material on the insulation base is preferably a stucco-like material. The finish layer can comprise two or more strata of material with the inner strata being a cement-plastic mix and the outer strata being a plastic material that gives a stucco appearance. The outer surface of the finish layer can also be patterned after the finish layer is applied onto the insulating base off-site and before it sets, if desired. For example, the outer surface can be patterned to look like imitation brick. When made to look like imitation brick, the siding panel is dimensioned so that each panel is just wide enough to have between one to five and preferably three or four courses or rows of bricks with the top and bottom front sides of the panel located in grooves between the brick courses.

[1008] Preferably, the insulating base has parallel relatively wide inner and outer surfaces joined by relatively narrow top and bottom edge surfaces. The edge surfaces extend at an angle ranging between twenty and seventy degrees to the inner and outer surfaces and are parallel to each other. The edge surfaces extend outwardly and downwardly from the inner surface. The interlocking means are provided on the edge surfaces inwardly spaced from both the inner and outer surfaces. The interlocking means on each edge surface comprise a projecting tongue adjacent an inwardly directed groove. The tongues and grooves are parallel to the inner and outer surfaces. The tongue on the upper edge is nearest the outer surface of the base while the groove on the lower edge is nearest the outer surface. The inner surface of the top tongue is aligned with the outer surface of the bottom tongue.

[1009] With a first siding panel already securely mounted onto the building frame, the bottom of a second siding panel is interlocked with the top of the first siding panel, the tongue on the bottom edge of the top second siding panel sliding into the groove on the top edge of the bottom first siding member and lying against the tongue on the top edge to locate it. The tongue enters the groove until the top and bottom edges abut and then the top panel is secured to the building.

[1010] The ends of the siding panels are provided with the same interconnecting means as used on the edges. The siding panels are cut to length on site as needed, with one end of the panels being cut in a manner to provide connecting tabs that can facilitate assembly of the siding panels with vertical inner or outer corner members, or molding members located around openings in the building's walls. as will be described.

[1011] The siding panels, with the relatively thick insulation base covered with a relatively thin stucco-like layer are light enough to be handled by one person, if needed, during installation. Once installed, the outer finish layer provides a finished surface to the building with no more finishing needed as with prior art panels.

[1012] The invention is particularly directed toward an insulated, one-side finished, siding panel light enough to be handled by one person during installation. The panel has an inner, relatively thick, insulation base and an outer, relatively thin, finish layer, the finish layer comprising a stucco-like material securely adhered to one surface of the insulation base. The panel has outer and inner surfaces joined by top and bottom edges, with the outer surface of the panel formed by the outer surface of the finish layer. The top and bottom edges of the panel are parallel and angled downwardly and forwardly from the inner surface. The siding panel is provided with interlocking means for securely interlocking the edges of adjacent siding panels together.

[1013] Preferably, the outer surface of the panel is scalloped at both the top and bottom sides adjacent the top and bottom edges with the top scallop forming an arc extending from between one hundred and ten degrees and one hundred and sixty degrees from the outer surface.

[1014] The invention is also directed toward an insulating base having parallel, relatively wide, inner and outer surfaces joined by relatively narrow top and bottom edge surfaces. The edge surfaces extend at an angle ranging between twenty and seventy five degrees to the inner and outer surfaces and are parallel to each other. The edge surfaces extend outwardly and downwardly from

the inner surface. Interlocking means are provided on the edge surfaces inwardly spaced from both the inner and outer surfaces.

[1015] The interlocking means on each edge surface preferably comprise a projecting tongue adjacent an inwardly directed groove. The tongues and grooves are parallel to the inner and outer surfaces. The tongue on the upper edge is nearest the outer surface of the base while the groove on the lower edge is nearest the outer surface. The inner surface of the top tongue is aligned with the outer surface of the bottom tongue.

[1016] The invention is also directed toward a right-angled corner accessory member for use with building siding panels, the member having a relatively thick insulation base with a finish layer adhered on one side of the base, one side surface of the member adapted to be located adjacent a corner of a building, the other side surface of the member formed by the outer surface of the finish layer, and a pair of panel receiving grooves formed in the base, the grooves at right angles to each other and opening away from each other.

BRIEF DESCRIPTION OF THE DRAWINGS

[1017] Fig. 1 is a cross-section view of a siding panel in accordance with this invention

[1018] Fig. 2 is a front perspective view of the base of the siding panel;

[1019] Fig. 3 is a cross-section view taken along line 3-3 in Fig. 2;

[1020] Fig. 4 is a cross-section view taken along line 4-4 in Fig. 2;

[1021] Fig. 5 is a detail view of two bases abutting;

[1022] Fig. 6 is a detail cross-section view showing the groove formed by two adjacent interlocked siding panels;

[1023] Fig. 7 is a detail cross-section view of the finish layer

[1024] Fig. 8 is a cross-section view of a starter member;

[1025] Fig. 9 is a cross-section view of an inside corner member;

[1026] Fig. 10 is a cross-section view of an outside corner member;

[1027] Fig. 11 is a cross-section view of a molding member; and

[1028] Fig. 12 is a cross-section showing the assembly of a panel on a starter member.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[1029] The siding panel 1 of the present invention, as shown in Fig. 1, has an inner base 3 of insulation material and an outer layer 5 of finish material. The outer layer 5 provides the finished outer surface on the panel.

[1030] The inner base 3, as shown in Figs. 1 to 4, is preferably made of polystyrene expanded foam material and has parallel inner and outer surfaces 7, 9, the inner and outer surfaces joined by parallel top and bottom edges 11, 13. The base 3 is relatively rigid or self supporting. The top and bottom edges 11, 13 are angled downwardly and outwardly from the top and bottom sides 15, 17 respectively of the inner surface 7 as shown in Fig. 3. The angle θ of the edges 11, 13 from the plane containing the inner surface 7 can range from between twenty and seventy degrees but preferably is around forty five degrees. The top and bottom side portions of the outer surface 9 are scalloped or dished inwardly to provide top and bottom concave corner surfaces 19, 21 on the outer surface 9. The corner surfaces 19, 21 join the outer surface 9 with the top and bottom edges 11, 13.

[1031] The inner base 3 also has end edges 27, 29 joining the inner and outer surfaces 7, 9. The end edges 27, 29 extend from the ends of the inner surface 7 and are also angled at an angle θ relative to the plane containing the inner surface 7 and are parallel to each other as shown in Fig. 4. The corners where the end edges 27, 29 join the ends of outer surface 9 are also scalloped or dished slightly inwardly to provide end concave corner surfaces 31, 33.

[1032] The top and bottom edges 11, 13 carry top and bottom interconnecting means 35, 37 respectively. The interconnecting means 35, 37 are spaced inwardly from the inner and outer surfaces

7, 9 of the inner base 3. The top interconnecting means 35 on the top edge 11 comprises a tongue member 39 extending upwardly from the top edge 11 and a slot 41 adjacent the tongue 39 extending inwardly into the base 3. The tongue 39 is nearest the outer surface 9 and both the longitudinal axii of the tongue 39 and slot 41 are parallel to the inner and outer surfaces 7, 9. The bottom interconnecting means 37 on the bottom edge 13 comprises a tongue member 45 extending downwardly from the bottom edge 13 and a slot 47 adjacent the tongue 45 extending inwardly into the base 3. The tongue 45 is nearest the inner surface 7 and both the longitudinal axii of the tongue 45 and slot 47 are parallel to the inner and outer surfaces 7, 9. The inner surface 49 of the top tongue 39 is aligned with the outer surface 51 of the bottom tongue 45. The tongues 39, 45 are slightly narrower than the slots 41, 47 to provide relatively easy entry of the tongues into the slots. Both interconnecting means 35, 37 are generally centrally located on the top and bottom edges 11, 13 of the base 3. The double tongue and groove interconnecting means provide a strong joint and precisely align the front surfaces of adjacent panels.

[1033] The end edges 27, 29 of the base 3 also have similar interconnecting means 53, 55. The interconnecting means 53, 55 are spaced inwardly from the inner and outer surfaces 7, 9 of the layer 3. The interconnecting means 53 on one end edge comprises a tongue 57 extending outwardly from the end edge 27 and a slot 59 adjacent the tongue 57 extending inwardly into the base 3. The tongue 57 is nearest the outer surface 9 and both the longitudinal axii of the tongue 57 and slot 59 are parallel to the inner and outer surfaces 7, 9. The interconnecting means 55 on the other end edge 29 comprises a tongue 61 extending outwardly from the end edge 29 and a slot 63 adjacent the tongue 61 extending inwardly into the base 3. The tongue 61 is nearest the inner surface 7 and both the longitudinal axii of the tongue 61 and slot 63 are parallel to the inner and outer surfaces 7, 9. The inner surface 65 of the one tongue 57 is aligned with the outer surface 67 of the other tongue 61.

[1034] The concave corner surfaces 19, 21 on the outer surface

9 of the base 3, are preferably part-circular. The top corner surface 19 extends in a circular arc from the outer surface 9 over an angle ranging from between one hundred and ten degrees and one hundred and sixty degrees. If the top and bottom edges 11, 13 of adjacent bases were abutted together, the corner surfaces 19, 21 together would form a semi-circular surface 71 as shown in Fig. 5. The center 73 of the surface 71 is on the plane 75 containing the outer surfaces 9 of the adjacent bases.

[1035] The above base 3 is made off-site. The outer layer 5 is added to the base off-site as well to complete the panel 1. It could be added at the same location that the base is made, or at a different location. The outer layer 5 is applied onto, and adhered to, the outer surface 9 of the base 3 including the curved surfaces 19, 21 on the top and bottom edges 11, 13 as shown in Fig. 6 and the curved surfaces 31, 33 on the end edges 27, 29 (not shown). The outer layer 5 provides the outer finished surface 77 of the panel 1 including the curved corner surfaces 79, 81 over the curved surfaces 19, 21 on the top and bottom edges 11, 13 of the base and curved end surfaces (not shown) over the end edges 27, 29 of the base. The curved corner surfaces 79, 81 of the layer 5 are concentric with the curved surfaces 19, 21. The end 87 of the portion of layer 5 on surface 19 is aligned with edge 11 and the end 89 of the portion of layer 5 on surface 21 is aligned with edge 13. Similarly, the curved end surfaces (not shown) are concentric with the curved surfaces 31, 33. The end of the layer on surface 31 is aligned with end edge 27 and the end of the layer on surface 33 is aligned with end edge 29.

[1036] When two panels 1 are interconnected along a horizontal joint by the top and bottom interconnecting means 35, 37, the curved corner surfaces 79, 81 together would form a curved surface 95 which defines a groove 97 between the interconnected panels at their joint. If the curved end surfaces 19, 21 are part-circular, the end surfaces 79, 81 are also part-circular and together form a semi-circular surface 95. The center of the surface 95 is the center 73. The top curved corner surface 79 extends in a circular arc from the plane 75 over an angle ranging from between one

hundred and ten degrees and one hundred and sixty degrees. The plane 99 where the edges 11, 13 of the base, and the ends 87, 89 of the layer 5 abut also intersects the center 73. The mouth 101 of the joint 103 formed between the edges 11, 13 and the ends 87, 89 is located above the center 73 and outwardly of the deepest penetration 105 of the groove 97 from the plane 75 due to the angle of the top and bottom edges. Any water dripping off the top outer surface 77 of the panel, will run down and past the mouth 101 of the joint 103 on the curved surfaces 79, 81 without entering the joint 103.

[1037] The layer 5 is relatively thin compared to the thickness of the base 3, as shown in Fig. 1. The outer layer 5 can comprise a first support strata 111, as shown in Fig. 7, applied onto the outer surface 9, the first support strata 111 covered with a reinforcing mesh layer 113, preferably made of fiberglass. A second support strata 115 is then applied over the mesh layer 113 and onto the first support strata 111. A coating strata 117 is then applied over the second support strata 115. The two support strata 111, 115 can be a suitable, known, stucco-like mix of plastic and cement material. The coating strata 117 is a plastic, imitation stucco-like material and provides the finished outer surface 77 of the siding panel. While one construction of the outer layer 5 has been described, other constructions could be used as well. For example the second support strata could be omitted on some siding panels. Or the coating strata could be a cement-plastic mix similar to the mix used in the support strata.

[1038] The siding panels are used with siding accessories such as starter members, inner and outer corner members and molding members. The starter member 121, as shown in Fig. 8, has an inner base 123 and an outer finish layer 125. The inner base 123 is a relatively thick strip of rigid, self-supporting, insulation material, having a flat bottom edge 127 and an angled top edge 129 joining two parallel inner and outer surfaces 131, 133. The angled top edge 129 has connecting means 135 thereon. The connecting means 135 comprise a projecting tongue 137 extending outwardly from the top edge 129 and a slot 139 adjacent the tongue 137

extending inwardly into the base 123. The tongue 137 is nearest the outer surface 133 while the adjacent slot 139 is nearest the inner surface 131. The corner between the outer surface 133 and the top edge 129 is scalloped to provide a concave surface 141. The outer layer 125 is the same in make-up as the outer layer 5 on the siding panel 1 and is adhered to the outer surface 133 and the concave surface 141. The top end edge 143 of the layer 125 is aligned with the top edge 129. The layer 125 forms a scalloped corner 144 on the concave surface 141. In some cases, (not shown) it may be desirable to extend the outer layer 125 under the base 123 adhered to the bottom surface 127. The bottom corners of the member 121 could also be scalloped if desired.

[1039] The inner corner member 145, as shown in Fig. 9 has a relatively thick base 147 made from rigid, self-supporting, insulation material. The base 147 has an inner surface 149 and a parallel outer surface 151 joined by angled side surfaces 153, 155. The side surfaces 153, 155 diverge from the sides of the inner surface 149. Each side surface 153, 155 is at an angle ϕ of one hundred and thirty five degrees to the inner surface 149. Connecting means in the form of slots 161 are cut into the base 147. The slots 161 extend inwardly from the outer surface 151 and are parallel to the side surfaces 153, 155. The distance 'A' from the outer wall 163 of the slot 161 to the side surface 153 or 155 is equal to the thickness of the siding panel 1 with its finish layer. The portion of the outer surface 151 between the slots 161 is coated with an outer layer 165. The outer layer 165 is the same in make-up as the outer layer 5 on the panel 1 and provides a finished outer surface 167.

[1040] The slots 161 receive the ends of siding panels which are cut, on site, to length and to provide tabs that enter the slots. As shown in Fig. 9, the siding panel 1 is first cut transverse to its edges to the proper length along an end 169 and then cut inwardly from both the end 169 and the inner surface 7 to provide the tab 171. The tab 171 is slightly narrower than a slot 161. When the tab 171 is inserted into the slot 161, the outer layer 5 on the panel 1 abuts the outer layer 165 on the member

145.

[1041] The outer corner member 175 has a relatively thick base 177 made from rigid, self-supporting, insulation material. The base 177 has an outer surface 179 and an inner surface 181 parallel to the outer surface. The inner surface 181 has a central notch therein with the walls 183, 185 of the notch extending at a forty five degree angle to the inner surface 181 and joining to form a ninety degree corner 187. The outer ends of the outer surface 179 are beveled at a forty five angle to form beveled surfaces 189, 191 that are parallel to the notch walls 183, 185 respectively. The end edges 195, 197 of the member are shaped to extend inwardly from the end of the beveled surfaces 189, 191 respectively at right angles thereto. Slots 201, 203 extend inwardly from the end edges 195, 197 respectively spaced inwardly from the beveled surfaces 189, 191 respectively and parallel thereto. The outer surface 179, the beveled surfaces 189, 191, and the end edges 195, 197 up to the slots 201, 203 are coated with a outer layer 205 of finishing material. The distance 'A' from the outer walls 207 of the slots 201, 203 to the notch walls 183, 185 is generally equal to the width of the panel 1.

[1042] The panel 1 is cut both to length and to provide a tab to enter a slot on the outer corner member 175. As shown in Fig. 10, panel 1 is cut to length to provide an end 209 that is transverse to the top and bottom edges of the panel, and then cut inwardly from end 209 and inwardly from the inner side 7 to provide a connecting tab 211 insertable into a slot 201 or 203. The tab 211 is cut in manner to have the outer layer 5 on the panel 1 abut the outer layer 205 on the end edges 195 or 197 when the tab 211 is inserted into one of the grooves 201, 203.

[1043] The moulding members 215 are provided for use around doors, windows and other openings in a building to receive the siding members 1. The molding member 215, as shown in Fig. 11, has base 217 with inner and outer surfaces 219, 221 joined by a flat bottom edge 223 and a top edge 225. The top edge 225 is formed with a step 227 providing a tongue 229 having one side formed by

the inner surface 219. The step 227 has a slot 231 formed therein adjacent the tongue 215. The bottom edge 223, outer surface 221 and the step 227 are covered with a finish layer 233.

[1044] To use the siding panels 1, the starter member 121 is installed first with its bottom flat edge 127 on the foundation 235 of a building and with its inner side 131 against the building wall 237 as shown in Fig. 8. The starter member 121 is fastened to the building by driving fasteners 239 through its angled top edge 129. The inner and outer corner members 145, 175 are also installed where the building walls form corners. The inner corner members 145 are fastened by suitable fasteners 241 passing through the end edges 153, 155 of the member, adjacent the slots 161, and into the building walls 243, 245. The outer corner members 175 are fastened by suitable fasteners 247 passing through the inner surface 181 adjacent the slots 201, 203 as shown in Fig. 10 and into the building walls 249, 251.

[1045] A first siding panel 1, as shown in Fig. 12, is connected to the starter member 121 by the bottom connecting means 37 on the panel and the top connecting means 135 on the starter member 121. The top edge 129 on the starter and the bottom edge 13 on the panel abut with the scalloped corner 144 on the starter and the scalloped corner 79 on the bottom of the panel forming a horizontal groove 255. The first siding panel 1 is fastened to the building wall by suitable fasteners 257 passing through the top edge 11 of the panel. Because of the angled top and bottom edges on the starter and the panel, the joint between them in the groove 257 is located above the center of the groove and outwardly of the greatest penetration of the groove.

[1046] It will be apparent that the siding panels join to each other and to the starter pieces in a groove area and thus the joints are not as noticeable. In addition, the manner in which they are joined horizontally prevents the entry of water into the joints. Additional siding panels are applied one at a time upon already installed siding panels. When applied, the vertical joints between the panels are staggered.

[1047] When the siding panels extend to the inner and outer

corner members or the molding members, they are hand cut on site to provide an end with a projecting tab that slides into a slot on the member. The tab is cut so that the outer finish layer on the panel abuts with the outer finish layer on the member. For a vertical molding member, the end of the siding panel is cut to provide a projecting back tab that slides into the slot on the molding strip with the finish edge adjacent the concave corner. For horizontal molding strips, the siding panel is cut to provide a top or bottom back tab that slides into the slot with the finish edge adjacent the concave corner on the strip.

[1048] The siding panels of this invention could be in the form of panels which are long and not very wide, the siding panels imitating regular metal or fiberboard siding panels that interlock at horizontal joints. The panels could also be small rectangular panels imitating stone panels. The outer finish layer could be modified to give the siding panel a different appearance such as a brick appearance. To modify the finish layer to provide a brick appearance, the width of the siding panel is made a multiple of the width of one course of bricks, the multiple ranging from between one and five but preferably three or four. Any more than five courses on each siding panel would make the siding panels too wide and heavy to be easily handled while a siding member with a single course of bricks would require the installation and handling of too many siding panels. The outer finish layer is embossed as it is applied to form the desired number of courses.